

EXERCISES

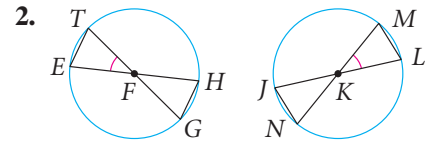
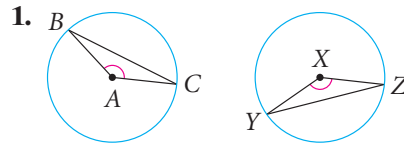
For more practice, see *Extra Practice*.

Practice and Problem Solving

A Practice by Example

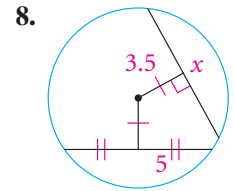
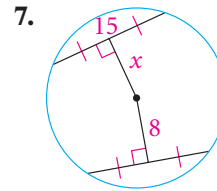
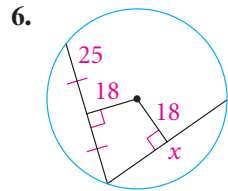
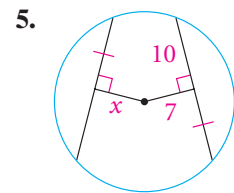
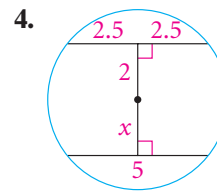
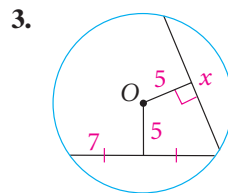
Example 1
(page 590)

In Exercises 1 and 2, the circles are congruent. What can you conclude?



Example 2
(page 591)

Find the value of x .

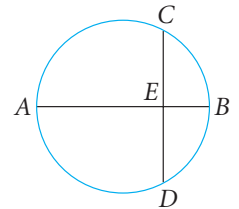


Example 3
(page 592)

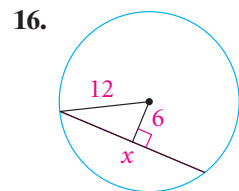
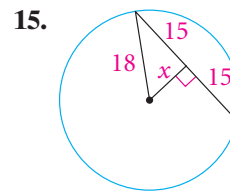
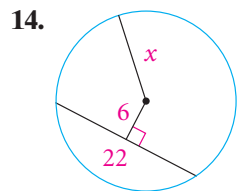
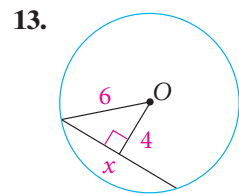
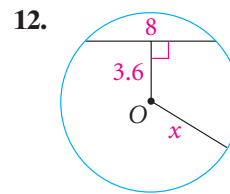
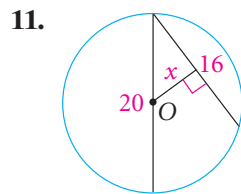
Use the diagram at the right to complete Exercises 9 and 10.

9. Given that \overline{AB} is a diameter of the circle and $\overline{AB} \perp \overline{CD}$, then a. $\underline{\hspace{1cm}} \cong \text{b. } \underline{\hspace{1cm}}$ and c. $\underline{\hspace{1cm}} \cong \text{d. } \underline{\hspace{1cm}}$.

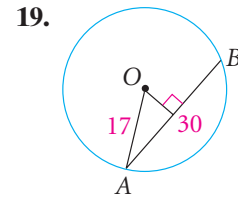
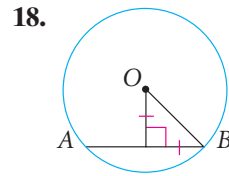
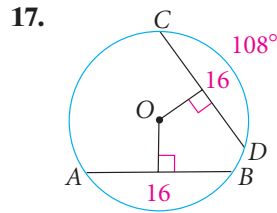
10. Given that \overline{AB} is the perpendicular bisector of \overline{CD} , then \overline{AB} contains $\underline{\hspace{1cm}}$.



Algebra Find the value of x to the nearest tenth.

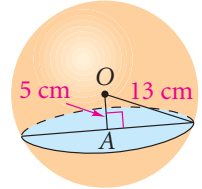


Find m . (Hint: You will need to use trigonometry in Exercise 19.)



20. **Archaeology** An archaeologist found several jar fragments including a large piece of the circular rim. How can she find the center and radius of the rim to help her reconstruct the jar?

21. **Geometry in 3 Dimensions** In the figure at the right, sphere O with radius 13 cm is intersected by a plane 5 cm from center O . Find the radius of cross section $\odot A$.



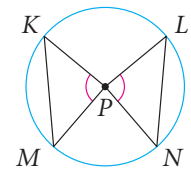
22. **Geometry in 3 Dimensions** A plane intersects a sphere that has radius 10 in. forming cross section $\odot B$ with radius 8 in. How far is the plane from the center of the sphere?

23. Complete the paragraph proof of Theorem 11-4, Part (1).

Given: $\odot P$ with $\angle KPM \cong \angle LPN$

Prove: $\overline{KM} \cong \overline{LN}$

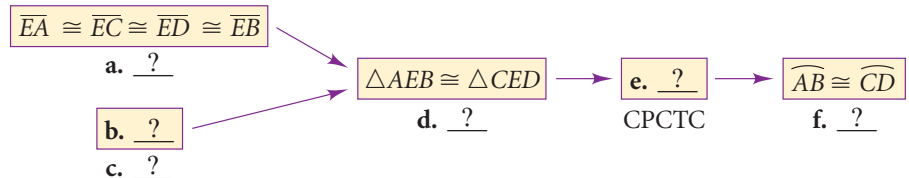
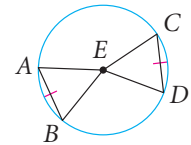
Proof: $\overline{KP} \cong$ a. $\underline{\hspace{1cm}}$ \cong b. $\underline{\hspace{1cm}}$ $\cong \overline{NP}$ because c. $\underline{\hspace{1cm}}$.
 $\triangle KPM \cong$ d. $\underline{\hspace{1cm}}$ by e. $\underline{\hspace{1cm}}$. $\overline{KM} \cong \overline{LN}$ by f. $\underline{\hspace{1cm}}$.



24. Complete the flow proof of Theorem 11-4, Part (2).

Given: $\odot E$ with congruent chords \overline{AB} and \overline{CD}

Prove: $\widehat{AB} \cong \widehat{CD}$

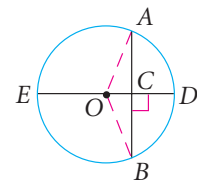


25. Complete the two-column proof of Theorem 11-6.

Given: $\odot O$ with diameter $\overline{ED} \perp \overline{AB}$ at C

Prove: $\overline{AC} \cong \overline{BC}$ and $\widehat{AD} \cong \widehat{BD}$

Begin by drawing \overline{OA} and \overline{OB} .



Statements	Reasons
1. $\overline{OA} \cong \overline{OB}$	a. $\underline{\hspace{1cm}}$
2. $\overline{ED} \perp \overline{AB}$	b. $\underline{\hspace{1cm}}$
3. $\angle ACO$ and $\angle BCO$ are right angles.	c. $\underline{\hspace{1cm}}$
4. $\overline{OC} \cong \overline{OC}$	d. $\underline{\hspace{1cm}}$
5. $\triangle AOC \cong \triangle BOC$	e. $\underline{\hspace{1cm}}$
6. $\overline{AC} \cong \overline{BC}$	f. $\underline{\hspace{1cm}}$
7. $\angle AOC \cong \angle BOC$	g. $\underline{\hspace{1cm}}$
8. $\widehat{AD} \cong \widehat{BD}$	h. $\underline{\hspace{1cm}}$



Need Help?

Recall that in a circle congruent central angles intercept congruent arcs.

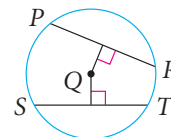


Reading Math

For help with reading and solving Exercise 26, see p. 597.

26. Two concentric circles have radii of 4 cm and 8 cm. A segment tangent to the smaller circle is a chord of the larger circle. What is the length of the segment?

27. **Error Analysis** Scott looks at this figure and concludes that $\overline{ST} \cong \overline{PR}$. What is wrong with Scott's conclusion?



28. **Open-Ended** Use a circular object such as a can or a saucer to draw a circle. Construct the center of the circle.



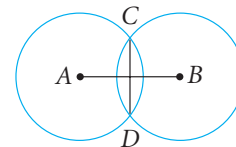
29. **Writing** Theorems 11-4 and 11-5 both begin with the phrase “Within a circle or in congruent circles.” Explain why “congruent” is essential for both theorems.

$\odot A$ and $\odot B$ are congruent. \overline{CD} is a chord of both circles.

30. $AB = 8$ in., $CD = 6$ in. How long is a radius?

31. $AB = 24$ cm, radius = 13 cm. How long is \overline{CD} ?

32. radius = 13 ft, $CD = 24$ ft. How long is \overline{AB} ?



33. **Coordinate Geometry** Find the length of the chord of the circle $x^2 + y^2 = 25$ that is formed by the line $x = 3$.

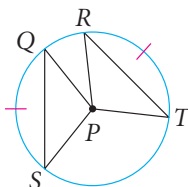
34. **Critical Thinking** The diameter of a circle is 20 cm. Two chords parallel to the diameter are 6 cm and 16 cm long. What are the possible distances between the chords to the nearest tenth of a centimeter?

Proof Write a two-column proof, paragraph proof, or flow proof.

35. Prove Theorem 11-4, Part (3).

Given: $\odot P$ with $\widehat{QS} \cong \widehat{RT}$

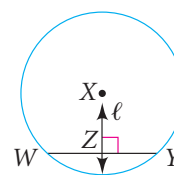
Prove: $\angle QPS \cong \angle RPT$



36. Prove Theorem 11-8.

Given: ℓ is the \perp bisector of \overline{WY} .

Prove: ℓ contains the center of $\odot X$.

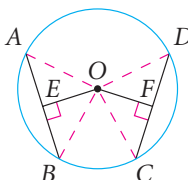


Challenge **Proof** Write a two-column proof, paragraph proof, or flow proof.

37. Prove Theorem 11-5, Part (2).

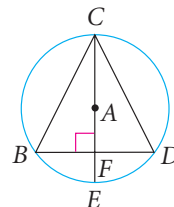
Given: $\odot O$ with $\overline{AB} \cong \overline{CD}$

Prove: $\overline{OE} \cong \overline{OF}$

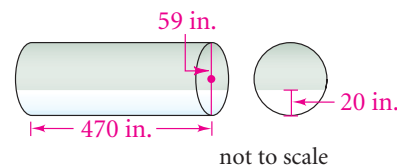


38. **Given:** $\odot A$ with $\overline{CE} \perp \overline{BD}$

Prove: $\widehat{BC} \cong \widehat{DC}$



39. **Dairy** The diameter of the base of a cylindrical milk tank is 59 in. The length of the tank is 470 in. You estimate that the depth of the milk in the tank is 20 in. Find the number of gallons of milk in the tank to the nearest gallon. (1 gal = 231 in.³)



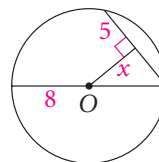
40. If two circles are concentric and a chord of the larger circle is tangent to the smaller circle, prove that the point of tangency is the midpoint of the chord.



Standardized Test Prep

Multiple Choice

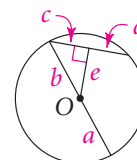
41. The diameter of a circle is 25 cm and a chord of the same circle is 16 cm. To the nearest tenth, what is the distance of the chord from the center of the circle?
 A. 9.0 cm B. 9.6 cm C. 18.0 cm D. 19.2 cm
42. In the figure at the right, what is the value of x to the nearest tenth?
 F. 3.0 G. 6.2
 H. 6.8 I. 9.0



Quantitative Comparison

Compare the boxed quantity in Column A with the boxed quantity in Column B. Choose the best answer.

- A. The quantity in Column A is greater.
 B. The quantity in Column B is greater.
 C. The two quantities are equal.
 D. The relationship cannot be determined from the information given.



Column A

Column B

43.	a	b
44.	d	e
45.	$b + d$	$a + c$

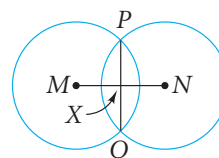


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Short Response

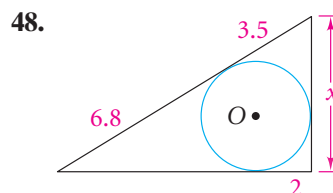
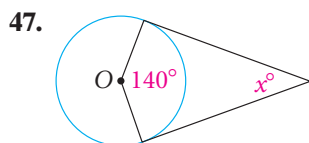
46. Circles M and N are congruent with radii measuring 13 cm. \overline{PQ} is a chord of both circles and $PQ = 18$ cm. To the nearest tenth, find MN . Justify your answer.



Mixed Review

Lesson 11-1

Assume that lines that appear to be tangent are tangent. O is the center of each circle. Find the value of x to the nearest tenth.



Lesson 9-3

49. From the top of a building you look down at an object on the ground. If your eyes are 50 feet above the ground and the angle of depression is 50° , how far is the object on the ground from the base of the building?

Lesson 8-5

50. The legs of a right triangle are 10 in. and 24 in. long. Find the lengths, to the nearest tenth, of the segments into which the bisector of the right angle divides the hypotenuse.